

- Fig. 9.* An *A. actinophora* with a distinct cortical layer (*rs*), and a tuft of pseudopodia at one end (Hartnack, oc. 3, obj. 7).
- Fig. 10.* Another with few pseudopodia, distinctly showing how they break through the cortex. (Rather too large in proportion to the following figures.)
- Fig. 11.* The same example a short time afterwards. The cortex (*rs*) is almost everywhere liquefied, and has become converted into a clear space (*h*): *n*, the nucleus, which is distinctly visible in this state.
- Fig. 12.* The same, with the cortex completely dissolved. *rc*, contractile vacuoles.
- Fig. 13.* The same, in slow flow in the direction indicated by the arrow. *rs*, the newly reconstituted cortex.
- Fig. 14.* Another example, in which the cortex has just become liquefied, but is still retained at one spot, together with two pseudopodia.
- Fig. 15.* An *Amaba* in which the cortex has dissolved before two pseudopodia (*ps*) were retracted. These become liquefied soon afterwards. In this and
- Fig. 16* the granular protoplasm is sharply separated from the hyaline zone. This, however, only lasts for a few moments, to give place to the state in fig. 12.
- Fig. 17.* An *Amaba* in which the liquefaction of the cortex had just commenced on one side, treated with osmic acid. The cortex (*rs*) appears finely punctate, as also the hyaline sarcode; the nucleus at *n*.

XV.—*Contributions towards a General History of the Marine Polyzoa.* By the Rev. THOMAS HINCKS, B.A., F.R.S.

[Continued from vol. viii. p. 136.]

[Plate V.]

IX. FOREIGN CHEILOSTOMATA (Miscellaneous).

Family Flustridæ.

FLUSTRA, Linnæus.

Flustra dentigera, n. sp. (Pl. V. figs. 7, 7 a.)

Zoarium of a rather dark-brown colour and a somewhat waxy appearance, with a narrow smooth edging, dividing dichotomously into tall, linear, strap-like segments, expanding very slightly upwards, which are not divergent, but continue in close proximity throughout their length. *Zoæcia* alternate, elongate, arched above and somewhat expanded, usually narrowing slightly below the middle, a line of nume-

rous denticles along the inner edges; margins thin, smooth, very little raised. *Oæcia* immersed, of large size, tall, of delicate material, perfectly smooth and shining. *Avicularia* none.

Loc. West Australia (*Miss Jelly*).

In some respects allied to *F. denticulata*, Busk, and notably in being furnished with marginal denticles, but differing from it in many points. It is quite destitute of spines and avicularia; and the oæcium is immersed, whereas in *F. denticulata* it is external and bears the large avicularium on its front. In the mode of branching and general appearance the two species are also very dissimilar.

I have only seen small pieces of *F. dentigera*, and can therefore give no account of the size which it attains; its habit of growth is very distinctive.

This form is not described in any of the Australian papers which I have met with, and seems to be new.

Family Membraniporidae.

MEMBRANIPORA, De Blainville.

Membranipora pilosa, Linnæus, form *multispinata*.
(Pl. V. fig. 6.)

Zoecia claviform, ovate above, narrowing off gradually towards the base; area occupying about two thirds of the front, with a membranous covering; margin thin, smooth, bearing on each side eight to ten slender compressed spines set very closely together, which bend abruptly inward, meeting and interdigitating in the centre; a single erect, rather stout, acuminate spine on each side at the top; immediately below the area a similar spine rising from a socket on the front wall; portion of the cell below the area smooth and silvery, bearing near the bottom two large membranaceous spines, placed one on each side, which sometimes attain a great length. No *avicularia*. *Oæcia* (?). *Zoarium* expanding regularly from the point of origin to a width of about four cells, and bifurcating at intervals; sometimes forming a regular crust.

Loc. West Australia, on weed (*Miss Jelly*).

M. pilosa is liable to so much variation that I do not venture to separate the present form from it, though it has a very definite character of its own.

Its chief peculiarities are the great number of the marginal spines, which are compressed and set closely together, and very much bent in, so as to present the appearance of a ribbed covering to the area, and the absence of the disks which

give the prettily speckled appearance to the front wall of *M. pilosa*. The margin of the aperture is not thickened as in the latter; and the two very tall spines near the bottom of the cell are an additional feature.

Membranipora variegata, Hincks.

[‘Annals’ for August 1881.]

The specimen on which my description of this well-marked and handsome species was founded proves to have been imperfect; and an important character has been omitted. In point of fact it belongs to the same group as our British *M. spinifera*, which is characterized by the presence of small, pointed avicularia, elevated on tall and slender pedicles. In the present case there is some irregularity in the position of these appendages; but when present they are commonly situated on one side of the cell, just behind the lowest of the two stout upper spines. The pedicle is much attenuated towards the base; the avicularium is narrow and elongate, and the beak scarcely bent at the extremity.

I am indebted to Miss Jelly for the opportunity of examining a number of specimens of *M. variegata*, and for drawing my attention to the very interesting fact that it is also sometimes furnished with avicularia of the ordinary type. This is the only case that has come under my notice in which the two forms are present on the same specimen. In one specimen, at the top of almost every cell there is a rather small, sessile or slightly raised avicularium, with the pointed mandible directed upwards. Occasionally three or four occur about the upper part of the cell.

In well-developed colonies of this species there is a marked contrast between the stout, tall, erect spines (usually six in number) round the upper part of the zoecium, and the slender, sharp, abruptly bent spines which protect the lower half of it. They are all furnished with a conspicuous black base.

Membranipora coronata, Hincks.

[‘Annals’ for February 1881.]

A specimen (probably from Ceylon) obtained by Capt. Cawne Warren is furnished with the chitinous portion of the avicularium, which was wanting in the one on which the original diagnosis was founded. I am now able to add that the appendage has a long vibraculoid mandible.

Family Microporidæ.

STEGANOPORELLA, Smitt.

Steganoporella (Vincularia) Neozelanica, Busk.
(Pl. V. figs. 9, 9 a, 9 b.)

I propose to test the method of classification which adopts the habit of growth as the chief basis of families and genera, by a reference to the history of this species.

It is (in one of its forms) an undoubted member of the genus *Vincularia*, DeFrance; the zoœcia are arranged round an imaginary axis, so as to form erect, subcylindrical, continuous stems; the front of the cell is surrounded by a raised border (Busk, B. M. Cat. pt. 2, p. 96). The character of the stem—the mode in which the zoœcia are aggregated—is the essential feature of the Vincularian family.

V. Neozelanica occurs in two or three different forms. Miss Jelly has kindly supplied me with a specimen which spreads in a single layer over the surface of a sponge and is simply incrusting. There is no special modification of structure adapting it to its peculiar habitat, such as we find in *Membranipora radificera*; but on one of the few cells of which the dorsal surface is exposed there is a large, stout, spinous process, which is possibly an effort towards the development of some additional means of attachment.

In the erect cylindrical form the stems are attached by means of a number of chitinous tubular fibres, which are given off from the surface of the lower cells (Pl. V. fig. 9 b).

Amongst the specimens which I owe to Miss Jelly are one or two small fragments of a broader and more compressed type, which approach more nearly to the ordinary Escharine habit. If we examine the zoœcium, we find that its structure agrees in every essential point with that which we have in *Steganoporella (Membranipora) magnilabris*, Busk. There is, indeed, the closest similarity between the two (compare Pl. V. figs. 8 & 9). It would be impossible, with any regard to natural affinity, to place these forms in separate genera*. But *S. magnilabris* is prevailingly an incrusting form; occasionally it assumes an erect, broadly foliaceous habit of growth. No cylindrical variety of it is known.

Another species which exhibits the same remarkable structural peculiarities as the two just referred to is *Steganoporella Smittii*, Hincks (Hist. of Brit. Mar. Pol. vol. i. p. 178). According to Mr. Goldstein, this species, which is known as

* Smitt has already made a similar remark ('Floridan Bryozoa,' pt. 2, p. 17).

an incrusting form, both fossil and recent, assumes the habit of *Vincularia* on the coast of Australia. It also occurs, according to this writer, (at Port Darwin) in an Escharine and Hemescharine form, as well as incrusting*. We have, then, the same type of cell, and *that a very remarkable and characteristic one*, associated with the Vincularian habit (*S. Neozelanica*); with the crustaceous and Escharine habit (*S. magnilabris*); and with the Hemescharine habit (*S. Smittii*). And, further, we have this type of cell combined with *all* these modes of growth (according to Goldstein) within the limits of a single species (*S. Smittii*).

The significance of these facts will be more fully appreciated if we consider the remarkable structural features of the cell which is common to *V. Neozelanica*, Busk, and *Membranipora magnilabris*, Busk. The chief character on which the genus *Steganoporella*, mihi (which embraces them both), is based, is the bithalamic condition of the zoecium. Some way below the upper extremity of the cell a diaphragm shuts off the lower portion of the cavity, and forms a distinct chamber for the polypide. A tubular passage (Pl. V. fig. 8 *a*) extends upwards from this chamber, and opens (in the two species before us) into the upper chamber, which is always large, and, in certain cells, of very ample dimensions; in the latter it probably represents the external oecium of other forms. The opening of this chamber is closed by a very large operculum, which also protects the entrance to the tubular passage through which the polypide issues. In the calcareous lamina covering the area there are two foramina, one on each side, which open into the upper chamber. In the two forms under consideration a screen-like denticle, deeply concave in front, rises from the edge of the tubular passage, and occupies the middle of the lower margin of the orifice. In the perfect state an opaque membrane extends from the base of the operculum to the bottom of the cell, a space intervening between it and the calcareous lamina. A glance at the figures (Pl. V. figs. 8, 8 *a*, and 9, 9 *a*) will show the exact similarity between the two forms in all essential points; they are also curiously alike in some of the minute details. It is impos-

* "Some new species of Bryozoa from the Marion Islands, with Notes on *Bicellaria grandis*," by J. R. Y. Goldstein. I have only a separate copy of this paper (for which I am indebted to Mr. Goldstein's courtesy), and am unable to give a more specific reference. The author considers the changes of habit in *S. Smittii* to be "a sort of mimetism," and he proposes to show "the importance of true zoarial habit as distinct from mimetic changes of form." I am not sure that I rightly apprehend the writer's meaning in this passage, and must be content to wait for a fuller statement of his views.

sible to doubt their close relationship; in no natural system could they be kept apart. Yet the one exhibits the technical characters of *Vincularia*, and the other a mode of growth which is generically distinct, according to the older systematists. If the method of the latter is adopted, they must go into different *families*.

This case is a crucial one; for the strongly-marked individuality of the zoecium leaves no doubt as to the close affinity of the two species, while, at the same time, the difference in zoarial habit is unusually striking.

We are led to the same result by a study of the various forms which exhibit the Vincularian mode of growth. So far as the zoecium is concerned they constitute a very heterogeneous assemblage. Some have the Membraniporan cell, such as *V. ornata*, Busk, and a number of species described by Waters in his valuable paper on Australian Tertiary Polyzoa*; *V. abyssicola*, Smitt, has the cell of *Setosella*, and ranks in the Microporidan family; *V. steganoporoides*, Goldstein, seems to belong to the same family. *V. Neozelanica*, Busk, is a typical *Steganoporella*, one of the best-marked of the Cheilostomatous genera; while *S. Smittii*, Hincks, is by turns a Vincularian, Escharine, or crustaceous species!

The conclusion to which we are almost irresistibly conducted is that the mere fashion of zoarial growth is not a safe test of affinity, that it is a very variable and comparatively unimportant element in the life of the species, and that, in such forms as we are now considering at least, it can give us little help in the construction of a natural system.

The Vincularian is one of the most strongly marked varieties of habit; yet, as we have seen, we find two forms the cells of which show that they are very slightly modified derivatives from a common ancestor, one of which is Vincularian and the other crustaceous or Escharine. We are brought very much to Prof. Smitt's conclusion, "that neither the agreement nor the diversity in the mode of building their colonies will give any warrant as to the natural affinities of the higher Bryozoa" ('Floridan Bryozoa,' pt. 2, p. 7).

The Vincularian habit then, like the Escharine, I regard as a condition that may be assumed (within certain limits) by the most diverse species; and the forms which exhibit it, either constantly or occasionally, must be placed in the groups to which their general structural peculiarities ally them. The genus *Vincularia* has no *raison d'être*.

Mr. Goldstein, in the paper referred to, urges that, as con-

* Quart. Journ. Geol. Soc., August 1881.

fessedly our present knowledge does not allow of a complete natural arrangement, it may be wiser to rest on the old lines and retain for the present the artificial system so long in use.

From this view I must entirely and earnestly dissent. I hold that it is all but demonstrated that zoöcial, and not zoarial, characters must be the basis of a *natural* classification of the higher Polyzoa. And if this be so, it is surely in every way better to apply this principle as far and as well as our present knowledge will permit, *and allow it to give the direction to further investigation*, than to perpetuate a system which, however convenient to the collector in the arrangement of his cabinet, gives him no help towards understanding the order of nature. Let us set our faces in the right direction, and while admitting freely the extent of our ignorance, make full use of the knowledge which we have.

The Radical Tubes.—The erect stems of *Steganoporella Neozelanica* are attached by tubular fibres; and in this respect it differs from its congeners. The difference, however, can hardly be accounted important. The fibres are a tubular extension of the membrane which covers the front of the cell, and seem only to originate from the zoöcia close to the base of the stem. In the (so-called) *Flustra solida*, Stimpson, the curious fibres which traverse the surface of the zoarium, uniting to form a kind of stem below, from which the radical fibrils are given off, originate in the same way from an epidermal covering of the cells. In the Microporidan *Vincularia abyssicola* * Smitt figures the cylindrical stem as continuous with the incrusting layer of cells from which it rises, and of course destitute of root-fibres. The stems of the present species probably rise in the same way from an incrusting layer; and if so, the tubes may be developed at a later stage, in preparation for the ultimate detachment of the stem from the adherent mass of cells.

Oöcium.—The very large size of the upper chamber in this form and the kindred *S. magnilabris*, in a certain number of the cells, suggests at once that it is the equivalent of the oöcium. If so, the modification is a very interesting one. The dithalamic condition is made subservient to the reproductive function; in certain of the cells the upper compartment is largely increased in size, and in this specialized form is no

* In a note on *V. abyssicola* ('Annals,' February 1881) I have stated that this species and *V. ornata*, Busk, are true "Membranoporidae." This is an error. The latter is a *Membranipora*, the former a *Steganoporella*, and belongs to the Microporidae.

In the same note the *second* sentence should read thus:—"I mention this to show how essentially Microporidan [not *Membraniporidan*, as printed] the zoöcial character of this form is."

doubt utilized as a brood-chamber. In other members of the genus the œcium is external; in the cells on which it occurs (in *S. Rozieri*, Audouin) the zoœcial orifice is much larger than in those which are destitute of it, but does not equal in size that of *S. magnilabris*. Above it an ample bilobate structure is developed, forming, as it were, a dome over the internal chamber, with the usual arched opening in front, which is closed by the large operculum. In the ordinary Cheilostomatous forms the inner chamber has no existence, and the œcium is a mere hood-like receptacle which overarches the orifice, on the upper margin of which, or immediately behind it, it takes its origin. In a previous paper ('Annals,' August 1881) I have described a modification of the œcium, which consists of an extension of the cell itself, roofed in by a number of marginal spines; and there are many other forms which have still to be investigated. The morphological history of the œcium has yet to be written.

The following species belong to the genus *Steganoporella*:—*S. Rozieri*, Audouin: Rio de Janeiro (*Darwin*); Mazatlan (*Dr. P. P. Carpenter*); California (*T. H.*); Zanzibar (*W. Oates*); India (*Miss Jelly*); Australia (*MacGillivray*); form *falcifera*, *ibid.* (*Miss Jelly*). *S. Smittii*, Hincks (= *Memb. Andegavensis*, Busk): Cornwall (*Peach*); North Australia (*Goldstein*); Coralline Crag (*Searles Wood*). *S. Neozelanica*, Busk: New Zealand (*Dr. Lyall*). *S. magnilabris*, Busk (= *S. elegans*, Smitt): Abrolhos Islet, Atlantic (*Darwin*); Algoa Bay (*Bowerbank*); Singapore (*T. H.*); Bass's Straits (*Cawne Warren*). *S. (Membranipora) perforata*, MacGillivray (probably a form of *S. Rozieri*), Victoria; and perhaps *Vincularia Novæ Hollandiæ*, Haswell: Queensland.

The species which I have described ('Annals,' Nov. 1880) under the names of *S. Jervisii* and *S. elongata* are referable to the genus *Micropora*, as is also the *Vincularia steganoporeoides* of Goldstein.

Family Monoporellidæ.

MONOPORELLA, Hincks.

Monoporella albicans, n. sp. (Pl. V. figs. 5, 5 a, 5 b.)

Zoœcia ovate, very irregularly arranged, convex, surface minutely granular, shining; orifice arched above, lower margin straight or very slightly curved outward, peristome not raised; just below the orifice a rostrum, with an *avicularium* on one side, mandible short, rounded; large *avicularia* distributed amongst the cells, elongate, the beak at the extremity

rising into a hood-like expansion (Pl. V. fig. 5 *b*); mandible long, broad at the base, narrowing off to about the centre and then of equal width to the extremity, which is rounded. *Oœcium* rounded, suberect, with a large opening in front, broader than high, surface minutely roughened, frequently an umbo on the top (Pl. V. fig. 5 *a*). *Zoarium* of a whitish shining material.

Loc. Singapore or Philippines (*Miss Jelly*).

Provisionally, at least, it will be better to keep the genus *Monoporella* apart from the *Microporellidæ*. If (as seems probable) the special pore of the latter is represented by the oral sinus of the *Myrizoidæ*, *Microporella* will have closer affinity with such forms as *Schizoporella* than with the present. As yet the species of *Monoporella* described are but few, and we have hardly material for a thorough study of the type.

There is a curious similarity in many points between this species and *Schizoporella aperta*, described in a subsequent part of this paper; and probably they may be not remotely connected genetically. But they are separated, in fact, by well-marked differences in the structure of the orifice, and for the purposes of classification are properly placed apart. At the same time we cannot be too often reminded that the hard-and-fast lines of our systems have no place in nature.

In the specimen of *M. albicans* which I have examined the oœcia, which are numerous, are placed in almost all cases (if not all) awry, so that the opening is turned sideways, instead of looking straight forward as is usual. This is probably a peculiarity of the special colony and not a general character.

Family Myrizoidæ (part.), Smitt.

SCHIZOPORELLA, Hincks.

Schizoporella incrassata, n. sp. (Pl. V. figs. 1, 1 *a*.)

Zoœcia ovate, quincuncial, punctured round the border, the marginal cells moderately convex, with a perfectly smooth surface, the older highly calcified, the walls very thick, vitreous, shining; surface covered with irregular nodulous masses; orifice suborbicular, with a well-marked rather narrow sinus on the lower lip, peristome in the younger cells thin and not elevated, in the adult zoœcia the orifice deeply immersed, the cell-wall much raised and thickened round it, forming a kind of shaft above it; at one side below the mouth a large rounded swelling, bearing on its upper surface a suberect pointed *avicularium*, placed transversely along one

side of the lower margin, and somewhat overhanging the mouth (the whole structure resembling a bird's head); mandible broad below, tapering off to a point above, apex incurved; frequently on the front of the cell a pointed *avicularium*, variously placed, the beak elongate, slanting upwards, aperture contracted about the middle, mandible triangular, basal portion of the avicularium extended into a pointed process, which forms a rest for the mandible when thrown back. *Oœcia* suberect, rounded, subimmersed; surface smooth (or sometimes nodulous), with a semicircular aperture in front, filled in by a thin, flat, calcareous plate, hyaline and perfectly smooth.

Loc. Africa, on coral (*Miss Jelly*).

This species affords a good illustration of the remarkable changes in the appearance of the zoœcium which may be caused by the progress of the calcification. In its early condition (as seen on the margin of the colony) the cell has a slightly convex and perfectly smooth surface of very delicate texture. The orifice is a simple opening, on a level with the surface, and without any thickening or elevation of the margin. At this stage there is no trace of the oral avicularium. In the second line of cells this organ is more or less perfectly developed; the orifice is already immersed and concealed by the rising of the peristome and the thickening of the wall, and the surface is dotted over with small vitreous nodules. In the centre of the colony a great thickness of vitreous crust is piled on the primitive surface of the cell, the orifice has disappeared at the bottom of a deep shaft-like opening of irregular form, and numerous nodular blocks overspread the surface, which are frequently consolidated into a compact mass, in which the avicularian rising is almost buried. The sutures between the cells are now all but obliterated, and the zoarium presents a continuous but uneven surface. The front avicularia are developed on the superimposed crust.

Schizoporella levata, n. sp. (Pl. V. fig. 4.)

Zoœcia small, disposed in lines, regularly ovate, convex, strongly sutured; surface perfectly smooth and shining; orifice arched above, lower margin straight, with a minute but well-marked central sinus, peristome not raised; below the orifice an umbonate rising, which sends off an arm on each side, so as to enclose it in front; on its summit a minute circular *avicularium*. *Oœcium* proportionally large, rounded, expanded above, and narrowing towards the orifice, very ventricose above, and somewhat depressed towards the open-

ing, which is small and bounded by a raised projecting margin, which embraces the orifice on each side; surface smooth and silvery, with very delicate striæ radiating from the base towards the opening.

A very pretty, subhyaline, and lustrous form.

Loc. Australia, on weed (*Miss Jelly*).

Schizoporella aperta, n. sp. (Pl. V. fig. 3.)

Zoœcia ovate, disposed in lines, very convex, especially towards the orifice, depressed below, sutures deep; surface roughened or minutely reticulate; orifice arched above, lower margin straight, with a rounded central sinus, contracted at the opening by two small projecting points, peristome not raised; immediately below the orifice a short rostrum, and on one side of it an *avicularium* with rounded mandible; large *avicularia* distributed rarely amongst the cells, elongate, raised, the beak rounded at the extremity, often projecting considerably beyond the elevation on which the appendage rests, the edge on each side towards the apex dentate; mandible smooth, of a light horn-colour, arched, except towards the point of origin, where it is flattened, very slightly attenuated towards the point, which is rounded. *Oœcium* cucullate, entirely open in front, the opening arched and somewhat elongated (taller than broad); surface slightly roughened. *Zoarium* whitish, of delicate texture.

Loc. Singapore or Philippines, on shell (*Miss Jelly*).

Family Escharidæ (part.), Smitt.

PORELLA, Gray.

Porella rostrata, Hincks. (Pl. V. fig. 2.)

I have received from Miss Gatty a fine specimen of this form, on which the oœcia are present; the following must be added to the diagnosis previously given ('Annals' for Nov. 1880):—

Oœcium very ample, covering a large part of the cell above, broad, rounded; surface smooth and shining, thickly covered with tall blunt papillæ.

It should also be noted that the surface of the zoœcium is more or less punctured.

EXPLANATION OF PLATE V.

- Fig. 1. *Schizoporella incrassata*, n. sp. 1 a. Marginal zoecia.
 Fig. 2. *Porella rostrata*, Hincks. Oœcium.
 Fig. 3. *Schizoporella aperta*, n. sp.
 Fig. 4. *Schizoporella levata*, n. sp.
 Fig. 5. *Monoporella albicans*, n. sp. 5 a. Cell with oœcium. 5 b. Large avicularium.
 Fig. 6. *Membranipora pilosa*, form *multispinata*.
 Fig. 7. *Flustra dentigera*, n. sp. 7 a. Nat. size.
 Fig. 8. *Steganoporella magnilabris*, Busk, with the membranous covering *in situ*. 8 a. Diagrammatic figure, showing the tubular entrance to the lower chamber*.
 Fig. 9. *Steganoporella Neozelanica*, Busk (Vincularian form), with its membranous covering. 9 a. Showing the structure of the cell. 9 b. Nat. size (two forms).

XVI.—Description of a new *Species of the Homopterous Genus Aphaena from Sumatra*. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

THE species which I here describe was obtained last year by purchase, and it struck me at once as a very beautiful and new Homopteron allied to *Aphaena submaculata*; but upon showing it to my friend Mr. W. L. Distant, I found that he was inclined to regard it as a very fine and highly coloured variety of that species, though without careful comparison of the structural details of the two insects he was not prepared to declare absolutely that they were not distinct. This, after a minute examination of our specimens, I am fully convinced to be the case, and therefore I do not hesitate to describe the species.

Aphaena chionœma, sp. n.

General form of *A. submaculata*, but the tegmina relatively broader across the middle, owing to the greater arch of the costal margin †; the outer margin is also very decidedly longer, forming an oblique straight edge instead of an arch continuous with that of the apical portion; the apex, therefore, is more prominent than in *A. submaculata*. The thorax,

* Actually the orifice of the tubular passage is placed far down within the upper chamber, and is not easily seen.

† This I have proved by careful measurement, the difference in width between the middle and the widest part in these wings being exactly 2 millim. both in the larger and the smaller insect; to an artistic eye the different outline is most marked.